AMENDMENTS TO THE CLAIMS

Claim 1. (Currently Amended) An integral structure comprising a base element and plurality of microneedles formed thereon, said microneedles suitable for penetrating the stratum corneum layer of skin, wherein said base element has a first side and a second side;

said plurality of microneedles comprising a plurality of projections which extend from the second side of said base element along longitudinal axes exhibiting at least one angle with respect to said base element; and

said plurality of projections being spaced apart from one another at a substantially predetermined separation distance, and said plurality of projections having a substantially uniform length, wherein:

said substantially predetermined separation distance is within a range of 50-1000 microns, and said substantially uniform length is within a range of 50-3000 microns,

wherein said microneedles have at least one sharp edge that enhances penetration of said microneedles through the stratum corneum layer of skin.

Claim 2. (Original) The integral structure as recited in claim 1, wherein said plurality of projections comprises a plurality of hollow elements, and wherein said substantially predetermined separation distance is within a range of 50-300 microns, and said substantially uniform length is within a range of 50-200 microns.

Claim 3. (Original) The integral structure as recited in claim 2, wherein said plurality of hollow elements each comprise an outer diameter in the range of 20-100 microns.

Claim 4. (Original) The integral structure as recited in claim 3, wherein said plurality of hollow elements each exhibit a substantially circular outer contour in a transverse plane that is substantially perpendicular to a longitudinal axis of said hollow element; and wherein said substantially predetermined separation distance is within a range of 100-200 microns, said substantially uniform length is within a range of 100-150 microns, and said plurality of hollow elements each comprise an outer diameter in the range of 20-50 microns.

Claim 5. (Original) The integral structure as recited in claim 3, wherein said plurality of hollow elements each exhibit an edged outer contour, in a transverse plane that is substantially perpendicular to a longitudinal axis of said hollow element, said outer contour having at least two sharp projections proximal to an end of the hollow element that is distal from said base element; and wherein said substantially predetermined separation distance is within a range of 100-200 microns, said substantially uniform length is within a range of 80-150 microns, and said plurality of hollow elements each comprise an outer diameter in the range of 20-50 microns.

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Claim 6. (Original) The integral structure as recited in claim 4, wherein at least one of said longitudinal axes of said microneedles is in alignment with one of a plurality of first openings in the second side of said base element; and wherein said hollow elements of said plurality of microneedles allow liquid to flow therethrough between a plurality of second openings at a distal end of said hollow elements and said first openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 7. (Original) The integral structure as recited in claim 5, wherein at least one of said longitudinal axes of said microneedles is in alignment with one of a plurality of first openings in the second side of said base element; and wherein said hollow elements of said plurality of microneedles allow liquid to flow therethrough between a plurality of second openings at a distal end of said hollow elements and said first openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 8. (Withdrawn) The integral structure as recited in claim 1, wherein said plurality of projections comprises a plurality of solid elements, and wherein said substantially predetermined separation distance is within a range of 50-300 microns, and said substantially uniform length is within a range of 50-200 microns.

Claim 9. (Withdrawn) The integral structure as recited in claim 8, wherein said plurality of solid elements each comprise a plurality of edged blades having a radius dimension, from a longitudinal axis of said solid elements, in the range of 10-50 microns.

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Claim 10. (Withdrawn) The integral structure as recited in claim 9, wherein said plurality of solid elements each exhibit a substantially star-shaped outer contour in a transverse plane that is substantially perpendicular to the longitudinal axis of said solid element; and wherein said substantially predetermined separation distance is within a range of 100-200 microns, said substantially uniform length is within a range of 80-150 microns, and said plurality of solid elements each comprise a blade radius in the range of 10-15 microns.

Claim 11. (Withdrawn) The integral structure as recited in claim 10, wherein at least one of said longitudinal axes of said microneedles is located proximal to a plurality of openings in the second side of said base element; and wherein said plurality of microneedles allows liquid to flow along their outer surfaces through said openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 12. (Withdrawn) The integral structure as recited in claim 1, wherein each microneedle element is constructed of one of: a metal material manufactured by a micromachining process, a plastic material manufactured by a micromolding process, or a semiconductive material manufactured by a semiconductor fabrication process.

Claim 13. (Currently Amended) An integral structure comprising a base element and plurality of microneedles formed thereon, said microneedles suitable for penetrating the stratum corneum layer of skin, wherein said base element has a first side and a second side;

said plurality of microneedles comprising a plurality of projections which extend from the second side of said base element along longitudinal axes exhibiting at least one angle with respect to said base element; and

said plurality of projections being spaced apart from one another at an average separation distance, and said plurality of projections having an average length, wherein:

said average separation distance is within a range of 50-1000 microns, and said average length is within a range of 50-3000 microns,

wherein said microneedles have at least one sharp edge that enhances penetration of said microneedles through the stratum corneum layer of skin.

Claim 14. (Original) The integral structure as recited in claim 13, wherein said plurality of projections comprises a plurality of hollow elements, and wherein said average separation distance is within a range of 50-300 microns, and said average length is within a range of 50-200 microns.

Claim 15. (Original) The integral structure as recited in claim 14, wherein said plurality of hollow elements each comprise an outer diameter in the range of 20-100 microns.

Claim 16. (Original) The integral structure as recited in claim 15, wherein said plurality of hollow elements each exhibit a substantially circular outer contour in a transverse plane that is substantially perpendicular to a longitudinal axis of said hollow

element; and wherein said average separation distance is within a range of 100-200 microns, said average length is within a range of 100-150 microns, and said plurality of hollow elements each comprise an outer diameter in the range of 20-50 microns.

Claim 17. (Original) The integral structure as recited in claim 15, wherein said plurality of hollow elements each exhibit an edged outer contour, in a transverse plane that is substantially perpendicular to a longitudinal axis of said hollow element, said outer contour having at least two sharp projections proximal to an end of the hollow element that is distal from said base element; and wherein said average separation distance is within a range of 100-200 microns, said average length is within a range of 80-150 microns, and said plurality of hollow elements each comprise an outer diameter in the range of 20-50 microns.

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Claim 18. (Original) The integral structure as recited in claim 16, wherein at least one of said longitudinal axes of said microneedles is in alignment with one of a plurality of first openings in the second side of said base element; and wherein said hollow elements of said plurality of microneedles allow liquid to flow therethrough between a plurality of second openings at a distal end of said hollow elements and said first openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 19. (Original) The integral structure as recited in claim 17, wherein at least one of said longitudinal axes of said microneedles is in alignment with one of a plurality of first openings in the second side of said base element; and wherein said hollow elements of said plurality of microneedles allow liquid to flow therethrough between a plurality of second openings at a distal end of said hollow elements and said first openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 20. (Withdrawn) The integral structure as recited in claim 13, wherein said plurality of projections comprises a plurality of solid elements, and wherein said average separation distance is within a range of 50-300 microns, and said average length is within a range of 50-200 microns.

Claim 21. (Withdrawn) The integral structure as recited in claim 20, wherein said plurality of solid elements each comprise a plurality of edged blades having a radius dimension, from a longitudinal axis of said solid elements, in the range of 10-50 microns.

Claim 22. (Withdrawn) The integral structure as recited in claim 21, wherein said plurality of solid elements each exhibit a substantially star-shaped outer contour in a transverse plane that is substantially perpendicular to the longitudinal axis of said solid element; and wherein said average separation distance is within a range of 100-200 microns, said average length is within a range of 80-150 microns, and said plurality of solid elements each comprise a blade radius in the range of 10-15 microns.

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Claim 23. (Withdrawn) The integral structure as recited in claim 22, wherein at least one of said longitudinal axes of said microneedles is located proximal to a plurality of openings in the second side of said base element; and wherein said plurality of microneedles allows liquid to flow along their outer surfaces through said openings at the second side of said base element; and a container structure comprising a reservoir capable of holding a liquid.

Claim 24. (Withdrawn) The integral structure as recited in claim 13, wherein each microneedle element is constructed of one of: a metal material manufactured by a micromachining process, a plastic material manufactured by a micromolding process, or a semiconductive material manufactured by a semiconductor fabrication process.